

FM-IF RADIO SYSTEM

NOT FOR NEW DESIGN

- HIGH LIMITING SENSITIVITY
- HIGH AMR
- HIGH RECOVERED AUDIO
- GOOD CAPTURE RATIO
- LOW DISTORTION
- MUTING CAPABILITY

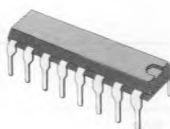
The TCA3089 is a monolithic integrated circuit in a 16-lead dual in-line plastic package. It provides a complete subsystem for amplification of FM signals.

The functions incorporated are:

- FM amplification and detection
- Interchannel controlled muting

- AFC and delayed AGC for FM tuner
- Switching of stereo decoder
- Driver of a field strength meter

The TCA3089 can be used for FM-IF amplifier application in Hi-Fi, car-radios and communication receivers.



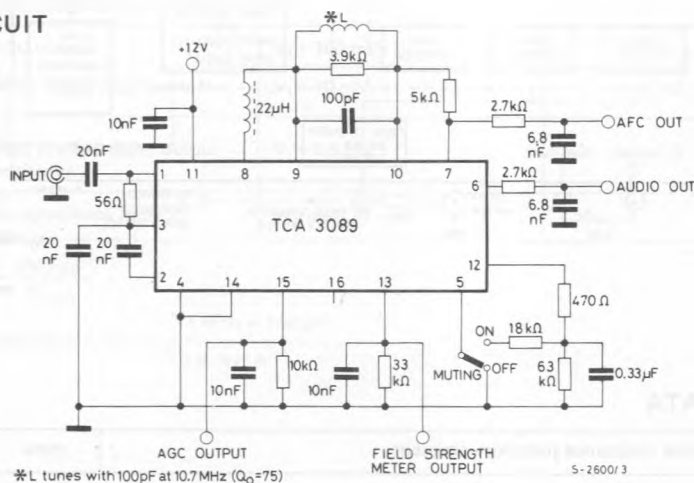
DIP-16 Plastic
(0.25)

ORDERING NUMBER: TCA3089

ABSOLUTE MAXIMUM RATINGS

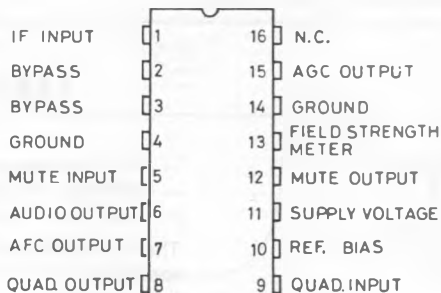
V_s	Supply voltage	16	V
I_o	Output current (from pin 15)	2	mA
P_{tot}	Total power dissipation at $T_{amb} \leq 70^\circ\text{C}$	800	mW
T_{stg}	Storage temperature	-55 to 150	$^\circ\text{C}$
T_{op}	Operating temperature	-25 to 70	$^\circ\text{C}$

TEST CIRCUIT



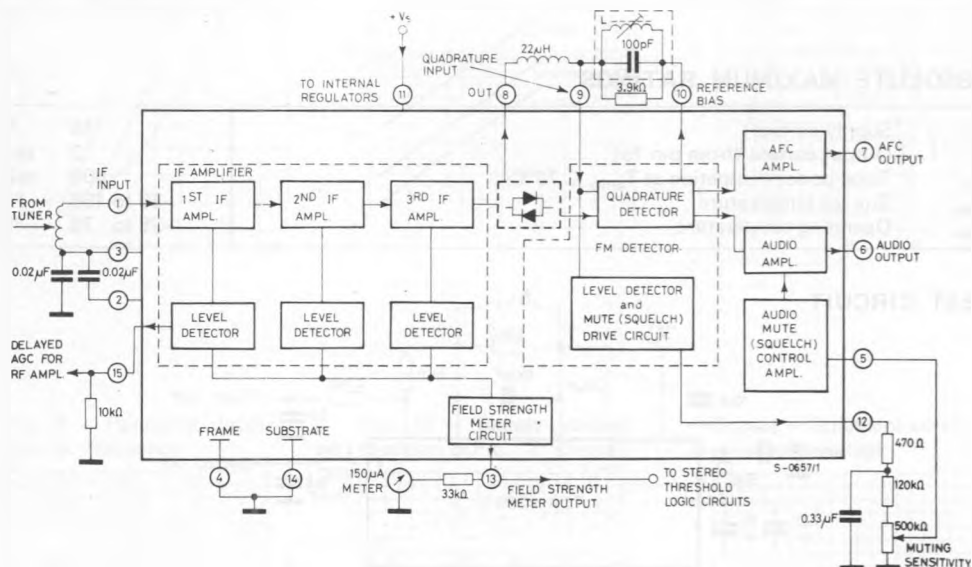
CONNECTION DIAGRAM

(top view)



S-0398/1

BLOCK DIAGRAM



THERMAL DATA

 $R_{th j-amb}$ Thermal resistance junction-ambient

max 100 °C/W

ELECTRICAL CHARACTERISTICS(Refer to the test circuit; $V_s = 12V$, $f_o = 10.7\text{ MHz}$, $V_5 = 0V$, $T_{amb} = 25^\circ C$)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
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DC CHARACTERISTICS

I_s	Supply current	16	23	30	mA
V_i	Voltage at the IF amplifier input	1.2	1.9	2.4	V
V_2, V_3	Voltage at the input bypassing	1.2	1.9	2.4	V
V_6	Voltage at the audio output	5	5.6	6	V
V_{10}	Reference bias voltage	5	5.6	6	V

AC CHARACTERISTICS

$V_{i(\text{threshold})}$	Input limiting voltage (-3 dB) at pin 1	$f_m = 1\text{ kHz}$ $\Delta f = \pm 75\text{ kHz}$		12	25	μV
V_o	Recovered audio voltage (pin 6)	$V_i \geq 100\text{ }\mu V$ $f_m = 1\text{ kHz}$ $\Delta f = \pm 75\text{ kHz}$	300	400	500	mV
V_7	Recovered audio voltage (pin 7)		200	350	500	mV
d	Distortion	$V_i \geq 1\text{ mV}$ $f_m = 1\text{ kHz}$ $\Delta f = \pm 75\text{ kHz}$		0.5	1	%
$\frac{S+N}{N}$	Signal to noise ratio		60	67		dB
AMR	Amplitude modulation rejection	$V_i = 100\text{ mV}$ $f_m = 1\text{ kHz}$ $\Delta f = \pm 75\text{ kHz}$ $m = 0.3$	45	55		dB
V_i	Input voltage for delayed AGC action (pin 1)			10		mV
V_{15}	AGC output	$V_i = 100\text{ mV}$			0.5	V
$\frac{\Delta I_7}{\Delta f}$	AFC control slope (note 1)	$V_i = 10\text{ mV}$		1.2		$\frac{\mu A}{kHz}$
V_{13}	Field strength meter output sensitivity	$V_i = 0.5\text{ mV}$		1.5		V
	No signal mute (note 2)	muting: ON	55			dB

Note: 1) $\Delta I_7 = \frac{\Delta V_{7,10}}{R_{7,10}}$

2) No signal mute = $20 \log \frac{V_o @ V_i \geq 100\text{ }\mu V}{V_o @ V_i = 0}$

Fig. 1 - Relative recovered audio and noise output vs. input voltage

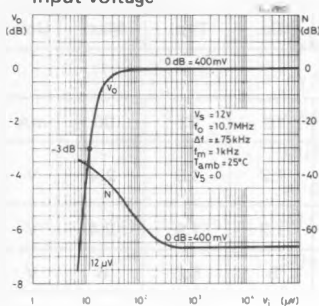


Fig. 2 - Capture ratio vs. input voltage

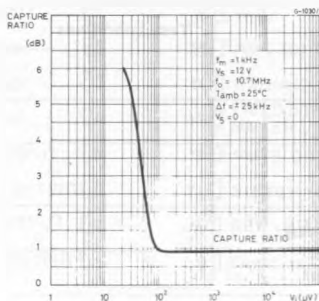


Fig. 3 - AGC (V_{15}) and field strength meter output (V_{13}) vs. input voltage

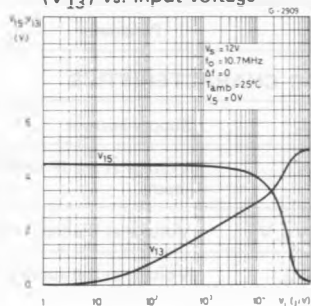


Fig. 4 - AFC output current vs. change in tuning frequency

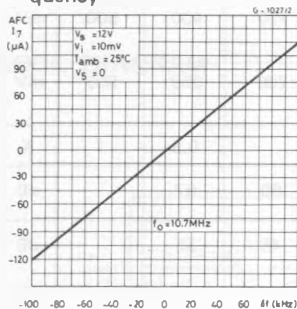


Fig. 5 - Amplitude modulation rejection vs. input voltage

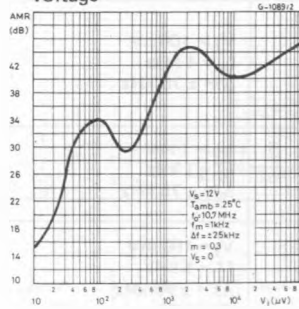


Fig. 6 - AMR vs. change in tuning frequency

